



# Achieving Energy Efficiency Through Polymeric Claddings

2021 International Energy Conservation Code

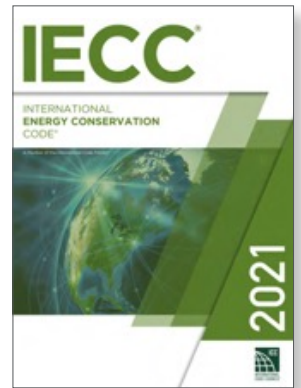


## Did you know...

...polymeric claddings, including vinyl siding, insulated vinyl siding and polypropylene siding, are some of the only cladding material categories that have been used extensively with insulation options?

Polymeric claddings on the market today meet current building codes, and insulated vinyl siding (a form of continuous insulation), in particular, is useful in meeting the **2021 International Energy Conservation Code (IECC)** requirements. The IECC, often called the “energy code,” is the primary regulatory tool for energy-efficient residential construction.

The energy efficiency for many building materials is known as its R-value; the higher the value, the more efficient (or resistant to heat transfer) it is. Many cladding materials don’t have measured R-values that can increase the wall’s overall by at least R-2 and even up to R-3 or more, providing a substantial improvement in the energy efficiency of a home and a significant reduction in energy bills.



R-Value 2.0  
or greater



Continuous insulation requirements vary by climate zone and construction assembly. Beginning with zone 3 in the Southeast, and moving North, at least R-5 will be required as the 2021 energy code is adopted. In the Northern climate zones 5, 6 and 7, R-10 continuous insulation will be required. It’s essential to understand that products may be layered to reach these continuous insulation requirements. For example, if R-5 is required, you can use an R-2 insulated vinyl siding with an R-3 insulated sheathing to meet the code. See Climate Zone map on page 5.




## Get the Facts

The IECC's 2021 energy code **requires continuous insulation** on residential structures, especially in most mid-Atlantic and all Northern climates, and is being **adopted as a requirement by more and more states**.

The good news: you can use insulated vinyl siding to help meet the energy code's continuous insulation requirements.

Insulated vinyl siding is engineered to incorporate a substantial insulation thickness of at least R-2. More specifically, it's a vinyl cladding with manufacturer-installed rigid foam plastic insulation that's laminated – or permanently attached – to the product.



*Did you know,  
insulated vinyl siding  
comes in many different  
profiles and colors?*



Here are some facts you need to know:

- Insulated vinyl siding is listed in the energy code among the building materials that can be used as continuous insulation outside the building framing to provide the required total wall R-value for buildings and reduce thermal bridging in the coldest climate zones
- Insulated vinyl siding is offered in a diverse selection of profiles and colors to help customize new construction and renovation designs while providing thermal optimization
- Other polymeric claddings, including vinyl siding and polypropylene siding, have been used regularly for decades with other continuous insulation products, such as foam sheathing and “fan-fold” foam products. Together, they successfully improve energy efficiency in new construction and in repair and remodeling projects
- To learn more, visit the [Department of Energy \(DOE\)](#)



photo courtesy of Foam Sheathing Coalition

# A Simpler Solution: Polymeric Claddings Provide Solutions for Use with Continuous Insulation

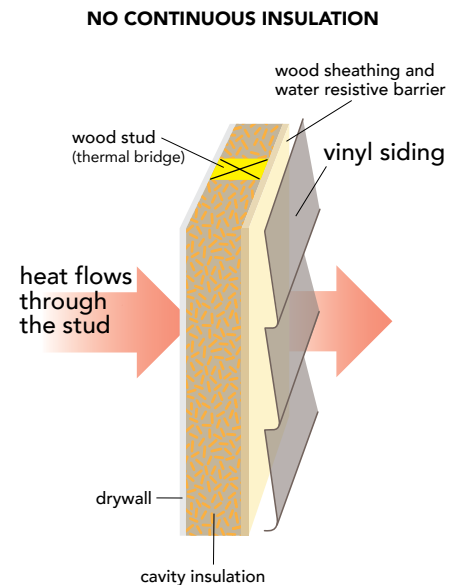
*Easier to Install, More Effective Than Cavity Insulation of the Same R-Value*

- **Wall cavity insulation.** Insulating material located between framing members lets heat escape more readily through the framing (or wood studs).
- **Continuous insulation.** Insulating material that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope. Insulated vinyl siding is continuous insulation, and other polymeric claddings can be used with insulated sheathing, a form of continuous insulation.

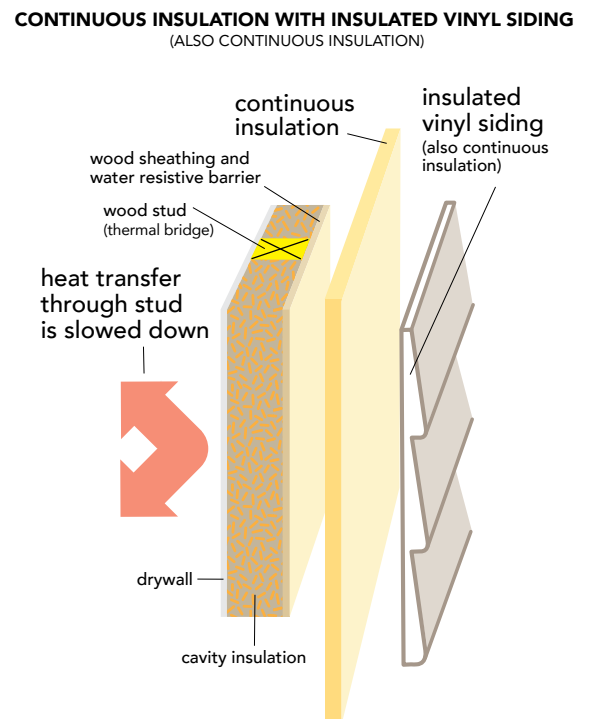
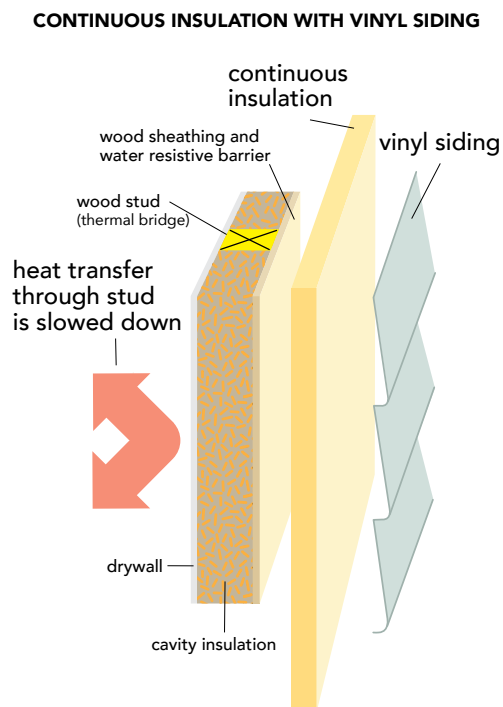
While many types of wall cavity insulation and continuous insulation exist, the effectiveness of the materials depends greatly on their location in the building envelope assembly.

Wall cavity insulation materials are located between framing members and, consequently, are thermally bridged in between the cavities by wood or steel framing. Continuous insulation materials are, as the definition notes, continuous. They are not to be bridged by major structural elements like framing or floor edges.

Thermal Bridging Cross Section Example

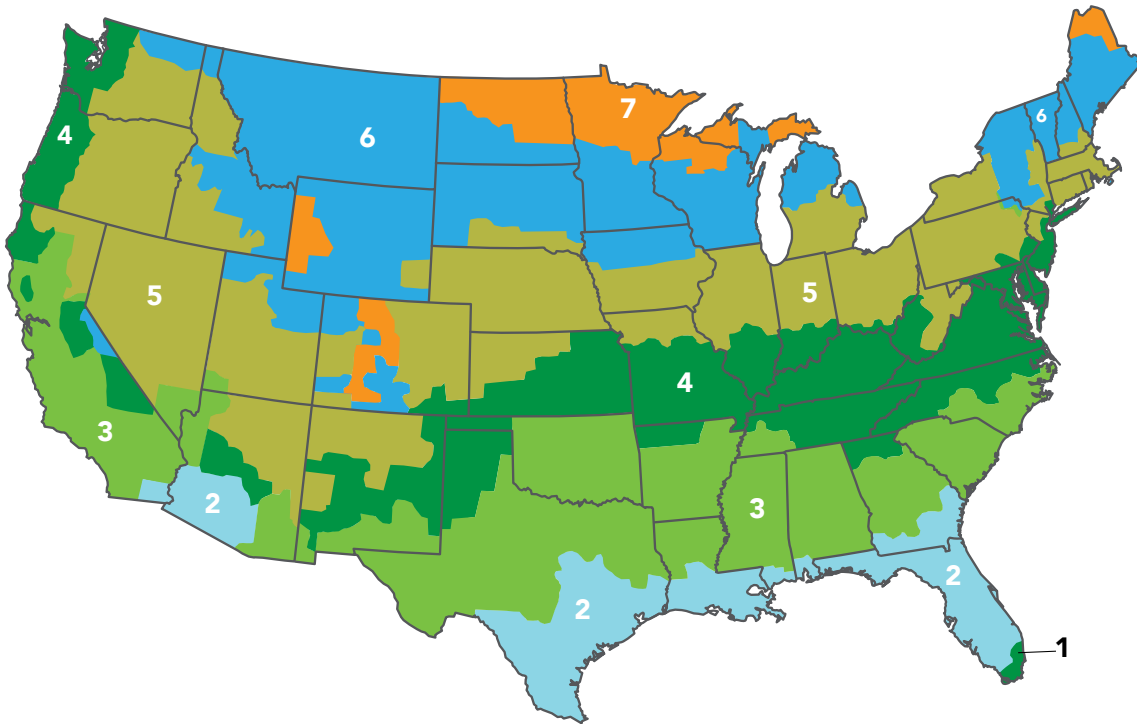


Reducing Thermal Bridging Cross Section Examples



# Climate Zone Map

Climate Zone	Continuous Insulation Requirements
3	R-5
4, 5, 6, 7	R-5 or R-10 depending on the wall insulation



## 2022 Inflation Reduction Act

A tax deduction and rebates are in the works to incentivize builders and designers to create energy-efficient buildings. This law reinstated energy credits for solar and geothermal residential projects starting January 1, 2023.

**The program** offers \$4.28 billion through 2031 to state energy offices to deliver rebates to homeowners for energy-saving retrofits, including home insulation or sealant, among many other home improvements. Additionally, funds will be available to train contractors on how to conduct home energy audits and install those improvements. Significantly, the cap on credits for these improvements will be boosted to \$1,200 - \$1,600, annually, or \$12,000 per household over 10 years.

Additional Resources:

<https://www.building-performance.org/hope4homes>

<https://www.naseo.org/issues/buildings/energy-codes>

<https://www.energy.gov/>

# How Continuous Insulation Reduces Thermal Bridging, Offers Energy Sealing

Continuous insulation has been widely accepted as the conventional construction method moving forward. Why? It helps reduce thermal bridging and produce a tighter home, creating a more energy-efficient, comfortable living environment.

Using continuous insulation and energy sealing is an effective, permanent solution now required by the building code and widely accepted as a primary method to improve the energy efficiency of existing older homes.

Using vinyl siding with integrated continuous insulation – or as part of an overall assembly using continuous insulation – is a proven method that has been used for decades.

## Cladding Weights and Opportunity

When constructing with continuous insulation, the building system expands and the cladding is typically pushed further away from the structural sheathing and framing.

This change is crucial as it affects how the claddings and trims are connected to the structural members. Cladding weights can impact the fasteners and can impact the potential need for additional nailable substrates called furring strips.

Polymeric claddings weigh between .5–1 lb. per square foot, whereas fiber cement products can weigh 3 – 5 lbs. per square foot, which can significantly impact how the product needs to be constructed and installed. Most siding calculations use the term square – a square is 100 square feet \*

**Vinyl siding weighs  
50-100 pounds  
per square.**

**Fiber cement  
siding weighs  
300-500 pounds  
per square.**

Chapter 7 of the **International Residential Code** provides specific installation requirements for the use of polymeric cladding with continuous insulation. In many cases, because of its lighter weight, polymeric claddings can be used over thicker continuous insulations without having to use additional furring strips (unlike fiber cement).

\*Source: [https://www.researchgate.net/figure/Approximate-Cladding-Weights\\_tbl1\\_311557381](https://www.researchgate.net/figure/Approximate-Cladding-Weights_tbl1_311557381)



## Reducing our Carbon Footprint

Choosing sustainability means choosing efficiency. And vinyl siding is efficient at every stage, from its resource-conscious manufacturing to its simple maintenance and onward to its easy recycling (where programs exist). Vinyl siding manufacturers are making steady and conscious progress at every step to lessen this material's carbon footprint. In fact, our carbon emissions have decreased 15% over the life cycle of vinyl siding in the past decade. That's 9.8 kg of CO<sub>2</sub> per 100 square feet. And we continue to invest in meaningful progress with our members to help address global warming with resilient and sustainable building materials<sup>1</sup>.



## VSI's Product Certification Program

Insulated vinyl siding is tested in accordance with ASTM D7793 *Standard Specification for Insulated Vinyl Siding*, which includes a provision for thermal resistance, or R-value. Once products have been tested and an R-value has been determined, the R-value must be displayed on the certified product packaging.



CERTIFICATION PROGRAM

Insulated vinyl siding can be used to meet the R-value/U-factor energy code requirements.

Additionally, vinyl siding and polypropylene siding can be used with other types of continuous insulation, such as foam sheathing or fan-fold foam products, to help achieve energy code compliance.



1. Based on industry Life Cycle Inventory and Analysis conducted in 2021 and 2016.



[www.vinylsiding.org](http://www.vinylsiding.org)



**Vinyl Siding Institute**  
1800 Diagonal Road  
Suite 545  
Alexandria, VA 22314